benign growth is not existant above the hemorrhoidal zone.

Always use the greatest care in making a rectocolonic examination after a recent hemorrhage. Even though skilled in the use of the sigmoidoscope, one sometimes finds it quite difficult to discover the exact spot from where the bleeding arises, and repeated examinations may be required before it can be located.

THE MANAGEMENT OF SURGICAL RISK. A REVIEW OF 100 KIDNEY AND PROSTATE OPERATIONS, AND 50 CASES OF ENLARGED PROSTATE NOT OPERATED UPON.*

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Pre-operative, operative and post-operative periods of management of certain surgical cases are often so interdependent that careless attention to the details of any one may counteract an absolutely perfect execution of the others. Mismanagement brings disaster most frequently in cases with marked clinical abnormalities. The commonest abnormality in old men with enlarged prostates is renal disturbance, and the problem is similar to that which occasionally arises in renal surgery. The risks encountered in both will receive emphasis in a joint consideration. The operative, clinical and therapeutic forces which control surgical risk may be outlined as follows:

I—Operative Conditions, depending on
- A, Region operated and Type of Operation.
- B, Surgical Technic and Team Work. (Skill of performance on the part of the surgeon, surgical assistants and nurses.)
- C, Anaesthesia
  - Choice
  - Skill of Administration
  - Duration.
- D, Complications
  - Operative
  - Post-operative.

II—Clinical Conditions, depending on
- E, Age of the patient.
- F, Physical Abnormalities
  - Cardiac
  - Renal
  - Cardio-renal
  - Diabetes
  - Anemia
  - Infection.
- G, Physical Reserve or Stamina.

III—Therapeutic Conditions, depending on
- H, Methods and Period of Preparation,
  - Preliminary
  - Pre-operative.
- I, Methods of Post-operative Treatment.

The present consideration will be confined to an analysis of therapeutic conditions.

One hundred and four surgical cases and 50 contemporary prostatics who have not been operated (in the two years 1915-1916) furnish the basis for the following review of methods of management. The prostate was enucleated by the perineal route in 49 and suprapubically in two cases. There were 24 nephrectomies, 8 nephrotomies, 3 ureterotomies, 2 pyeloplasties, 3 lumbar drainage cases, 5 pyelotomies, 2 ureterectomies and 6 nephropexies. There have been two operative deaths in the series, a mortality of 1.9%, both of which followed prostatectomy, giving an operative mortality of 4% (51 cases) for the prostate and no mortality for the kidney cases. Five of the prostatics (2 cancer) and one case of advanced bilateral renal tuberculosis (general phthysis) have come to death since operation, a final mortality, in two and one-half years, of 14% for the prostates and 0.1% for the kidneys. Nine of the unoperated prostatics (1 cancer) have died in the same period of time. An unoperative mortality of 18% deserves an honest scrutiny of these two probable factors: delay of the patient in seeking treatment until the condition has become practically hopeless, and the particular method of preparation.

The one complication in both prostate and kidney cases which deserves serious consideration is infection. In the prostate series urinary infection was practically universal. In 29 of the prostatectomy cases the pyuria was severe and present in a milder form in 12 others. In the milder forms infection is usually limited to the bladder and urethra, but in the severe types ureteritis, pyelitis, pyelonephritis or pyonephrosis is probable. This was proven by ureteral catheterization before operation in four cases and on the post-mortem table in all of six of the nine unoperated fatalities. These kidney and bladder infections may show exacerbation during the period of preparation or following operation, and lead to a speedy end; or may continue in a chromic form for months or years and eventually overcome local tissue resistance or reduce general resistance and initiate secondary infections elsewhere. The autopsies of two cases which lived almost a year after operation, showed cystitis, ureteritis, pyelonephritis, enteritis, colitis and broncho-pneumonia. In all but five cases of the unoperated series pus was present in the urine microscopically. Of the nine cases which have died each of the six necropsies showed a pronounced cystitis, ureteritis, and pyelonephritis. Three had a terminal broncho-pneumonia and one a lobar pneumonia. Endocardial vegetations were present in two and the myocardium showed inflammatory changes in three of the cases. In the other three fatalities the clinical evidence pointed to similar pathologic conditions, clearly to a cystitis, ureteritis and pyelonephritis.

The seriousness of urinary infection in kidney surgery is closely related to that of prostatism. This was impressed by an early experience as House Resident. A pyelotomy for stone was highly successful from an operative standpoint, but there was a persistent post-operative temperature, leucocytosis and every clinical evidence of severe sepsis. The streptococcus was recovered from the urine and the wound drainage. Probing with a clamp failed to open any retention abscess. Examination after death on the fifth day showed an acute bilateral pyelonephritis with ureteritis

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and cystitis. Excluding cases of infection of the surgical kidney there remain seven of this series in which a pyelitis or pyelonephritis imperiled the activity of the good kidney. Three other cases had bilateral stones and severe infection with small choice as to the better side; three others, bilateral tuberculosis, in two of which, however, the involvement of the supposedly healthy side was evidenced only by a positive guinea pig, function and urine being normal. Of the 50 cases, 53 kidney operations, 17 had bilateral disease.

The therapeutic management covers preliminary (preparatory, pre-operative) operative and post-operative periods, and comprises general and special procedures. The general principles of the management of clinical conditions belong more strictly to the field of internal medicine. The advice and judgment of a good internist is inestimable. The determination of cardiac, renal or cardio-renal involvement necessitates careful and repeated examinations, blood pressure records, cardiograms, renal functional studies and, in order to place the relative responsibility of the heart or kidneys in the final determination of cardio-renal cases, numerous therapeutic tests. Treatment will be in accord with the picture developed by these clinical and laboratory findings. It is important that the clinical and laboratory studies be continued throughout the course of management so as to control treatment. A routine procedure for all cases should be regarded as pernicious. Each case needs to be managed on its own merits. The relatively normal case deserves as jealous attention to the details of management as the severe clinical risk. The two operative deaths of this series were regarded as fair risks from the clinical standpoint. In old prostatics the clinical pictures are complicated by the influence of urinary back pressure. For this reason the first impression of grave cardiac or renal insufficiency may prove upon catheter relief of obstruction to be a manifestation of no great consequence. True nephropathies and cardiopathies have often preceded the disturbance from back pressure and with infection superadded present a grave prognosis and require prolonged and careful preparation. The improvement during the period of preparation is an indication of the ability to carry the burden of the cardiopathy or nephropathy after prostatectomy.

Preparatory management: The special procedures in the preparation which belong more strictly to the field of urology deal with the problem of urinary retention and urinary infection. Internal antiseptics and sedatives, urethral catheterization, cystotomy drainage, and ureteral catheterization comprise the methods which are variously used by urologists and which have undoubtedly contributed very considerably to the remarkable reduction in the mortality of prostate and kidney surgery in recent years.

The only internal urinary antiseptic of any particular value is hexamethylenamine. In order to manifest antiseptic action a certain concentration for a period of exposure in an acid urine is required. At least 15 grains by mouth three or four times daily are necessary even in favorable cases and then its short stay precludes antiseptic power in the renal pelvis, except possibly in certain hydronephroses or conditions of concentrated excretion. The excretion of the drug is influenced by extrarenal and intrarenal conditions, the important ones being, respectively, a partial conversion into formaldehyde with a commensurate loss for the urine in the acid contents of the stomach, and a limited excretion by the kidneys proportional to the amount of normal secreting tissue. It will be seen that the prostatic is a most unfavorable case for hexamethylenamine therapy. The gastric irritation frequently caused by it antagonizes important dietary regulations which are so essential in the management. (The drug may be given in salol-coated capsules by mouth or by proctoclysis or rectal suppositories.) In cases of renal insufficiency it not only is useless because of the delayed and scanty output, but adds another excretory load to an already overburdened kidney. In the bladder, where normally it has its greatest usefulness, catheter drainage before and perineal or suprapubic drainage after operation almost completely nullifies its action. In addition, the ingestion of large quantities of water, which the general treatment of these cases so frequently demands, dilutes the drug by diuresis sufficiently to destroy antisepsis. In renal insufficiency cases, acid sodium phosphate, which in other cases may be used with advantage in conjunction with hexamethylenamine to increase urinary acidity, tends to increase an already dangerous blood acidosis. In most unilateral surgical kidneys, however, hexamethylenamine has advantages. In the majority of these cases the bladder functionates normally and the drug is excreted in double concentration by the hypertrophied healthy kidney, and probably exerts considerable prophylactic and curative bacteriostasis for the healthy kidney and for the bladder, but it is of little benefit to the diseased side.

Methylene blue in doses of one to five grains three or four times a day is of value in certain staphylococcic and streptococcic infections; as it is bacteriostatic to staphylococci in dilutions of 1. to 150,000, but it also tends to upset digestion. In the prostatic and in a large proportion of surgical kidneys, urinary infection is best treated by external urinary antiseptics and germicides by means of a urethral or ureteral catheter.

Certain other drugs with no claim to antisepsis are of value for their sedative and alkaline properties. In certain types of vesical or urethro-prostatic irritation and congestion simple bicarbonate of soda affords considerable relief. The "bladder mixture" of tincture of hyacyamus and potassium citrate is often invaluable. When required the bromides and other hypnotics should be used. Even the occasional urethro-vesical instillation of novocain by affording a few hours of rest will mark the beginning of the up-grade. In these irritable conditions the regulation of fluid intake is sometimes helpful; limitation of fluids in cases without much infection in which bladder rest brings relief, forced fluids, in others, for purposes of autogenic lavage.

A great deal has been written of the value of catheter preparation of prostatics, but little in regard to the details of such preparation. A num-

ber of cases of this series illustrate the grave dangers of catheter mismanagement. It is probably fair to state that these examples of a better hindsight occurred in the general service of charity hospitals and none in private practice. Case 36, Group II, entered a public ward with a residual of less than 100 cc. and a renal function that was practically normal. He was urinating every ½ to 1 hour, however, and was almost worn out. The interne placed a retention catheter which was frequently withdrawn by the patient only to be promptly replaced by an orderly. A pronounced urethritis and cystitis developed. Loss of sleep and worry quickly undermined the patient's resistance, and neglect of the bowels for four days hastened the course downward. A (ascending) renal infection developed and the patient died of a terminal pneumonia less than one week after admission.

The institution of catheter treatment should be made with strict attention to the past history and general clinical condition, the amount of residual, the degree and duration of urinary infection, the severity of urethro-vesical irritability and such vesical complications as stone, diverticulum, and tumor. The chief objects are to relieve any disturbance of renal function from back pressure and allow of kidney readjustment to the unaccustomed state of urinary freedom; to control or limit urinary infection, and, occasionally, simply to reduce urinary difficulty and frequency. The two methods available are continuous and intermittent catheterization. The choice will depend upon which method will be better borne by the patient and will more efficiently secure the desired result. Often they can be used alternately to advantage. Catheter treatment is not indicated in every case, but there will be few cases in which in some form it can not bring pre-operative benefit. Catheter life is well known to be precarious and carries a mortality of 15 to 20 per cent. It should never be started unless from necessity, except as a means of preparation for operation; for once begun it frequently can not be safely stopped. The present consideration deals strictly with pre-operative conditions.

Cases of large residuals (over 300 cc.), irrespective of bladder capacity, urinary infection and renal function; cases of small residuals with small bladder capacity, and most cases with pronounced pyuria, irrespective of residual and bladder capacity, are amenable to catheter treatment. The retention catheter is generally better suited to large residuals and interval catheterization to the others. The very large residuals should be relieved gradually because back pressure may have produced pelvic dilatation with resultant compression of the blood vessels of the renal pedicle, and any sudden relief might result in a dangerous renal hyperemia and congestion. For the first few days, therefore, the catheter should be plugged with a cork and the bladder emptied at intervals of every two to three hours. Each time a thorough bladder irrigation should be given, and 50 per cent. of the then bladder capacity left in until the next interval irrigation. Uninfected cases with large residuals demand extra care to combat the onset of infection when put upon catheter life. The case with a small contracted bladder requires frequent irrigations in an effort to enlarge and dilate the bladder.

Stiff gum catheters (silk woven) are preferable and those with a single or double elbow pass easiest. The use of a Benique obturator (prostatic stylet) is frequently required. Thorough irrigation and local anesthetization of the urethra should precede each catheterization. The catheter must be smooth, sound, and well lubricated. It should be passed slowly and without trauma. Internes and orderlies should be taught to catheterize without the use of sterile rubber gloves, which give a false security of asepsis.

Generally bladder irrigations, followed frequently by instillations, are essential in the care of a catheter after its insertion. The gravity method by which one to two liters of solution may be run in is much preferable to the syringe, except in certain cases in which bladder dilatation is desired. Boracic acid which is bland and non-irritating should be used oftenest. Potassium permanganate, bichloride of mercury, silver nitrate, and other antiseptics may be used in certain cases. An instillation after a boric acid wash of some one of the non-irritating germicides is of great value. One-half to one ounce of argyrol, 5 per cent.; silver iodide, 5 per cent.; protargol, ½ of 1 per cent., etc., may be injected into the bladder and retained as long as convenient. Goulay's solution (1/10 per cent. of acetic acid and potassium acitate) is beneficial in some colon infections. With certain strains of bacillus coli instillations of solutions of the bacillus bulgaricus considerably relieves irritability and often permanently lessens infection. It is advantageous to use a different substance for instillation each day so that the organisms are given no chance to acquire a drug immunity. It is very important to carefully watch the condition of the urethra. Injections at the meatus alongside the catheter may be given once or twice daily in order to keep the urethra in a clean and healthy condition. Care should be taken not to use too strong or irritating solutions. Upon the evidence of urethral discharge or irritation the catheter should be withdrawn and left out three to four hours before replacement; or, periodic catheterization may be substituted for a few days, the urethra meanwhile being treated by irrigations or injections. It is a safe rule never to retain a catheter longer than three to four days, no matter how successfully it works, without removing it in order to cleanse and treat the urethra. Epididymitis is almost invariably the result of an antiperistalsis of the vas deferens induced by reflex stimulation of an inflammatory or irritated colliculus.

The frequency with which irrigations and injections are used must be regulated by the type and severity of the infection that is present. With little or no infection, twice daily is as long an interval as is safe, and it is well to follow one of these daily irrigations by an instillation. In badly infected cases, irrigations every three hours, alternately, of boracic acid and potassium permanganate;

each boric irrigation followed by a vesical instillation, is advisable.

Catheterization treatment requires a great deal of work day and night. A few hours of neglect will offset weeks of care. Without sufficient and trained assistance the surgeon is powerless, and the case will be far better without the risk of catheter treatment. Under such circumstances suprapubic cystotomy is the better choice from the beginning.

Suprapubic cystotomy: Under ideal conditions suprapubic drainage is rarely required in the preparation. Its advantage, as shown by the results obtained by men who perform cystotomy as a routine in all cases of suprapubic enucleation has not been proven. Cases, however, with marked urethrovesical infection and irritability, with calculus, tumor or infected diverticulum in which catheterization is difficult, painful and inefficient should have early suprapubic drainage established. Of the three cases in which this was done in this series not one survived. The cases, however, were all critical and furnish no potent argument against cystotomy. Skillful catheter treatment offers equal advantages for combating infection. Cystotomy is only to be preferred when the necessary assistance for proper catheter treatment is not available and, occasionally, when bladder complications exist.

Renal lavage: The virtue of renal lavage in non-tubercular infections of the kidney is universally recognized. It is practiced almost exclusively by urologists, and, by them as a class, with unpardonable infrequency. The wisdom of the preparatory treatment of an infected kidney before removal of its functionless fellow is indisputable. It is rare that emergency surgery obtains in kidney work, and a week or ten days of such preparatory management will ward off an occasional post-operative collapse of an organ upon whose healthy activity the very life of the patient depends. In cases of bilateral infections with bilateral stones the establishment of local immunity is essential. Operation in the presence of leukocytosis and fever is precarious. Ureteral catheterization and renal lavage, by dilating the strictured and diseased ureters and establishing better drainage, and by combating the infection, will greatly reduce surgical risk. It will be seldom that ureteral catheterization can be done in the presence of an intravesical hypertrophy, but its advantages in cases of pyelitis and pyelonephritis are obvious.

It was done in two cases of this series which suffered an acute exacerbation during preparatory treatment. The kidneys were lavaged with one per cent. silver nitrate, twice in one and four times in the other, with great benefit in both. A word of caution is excusable. Cystoscopy in cases with very large prostates is difficult and may produce severe reactions. Successful ureteral catheterization in any event would be improbable. It is essential that trauma be avoided. No. 18 F. single catheterizing cystoscope occasions the least disturbance. The results in the two cases mentioned justify the more general use of this method of combating renal infection in the preparatory treatment of enlarged prostate cases.

Pre-operative treatment: Surgeons have begun to realize the error of pre-operative purgation. It weakens the patient and leaves the bowels in a partially paralyzed condition. (Alvarez.) Recall your own individual physical depression immediately following an unusually efficient cathartic. This intestinal mal-treatment carries a real danger in renal surgery in which rough handling of the kidney pedicle may injure, functionally, at least, the sympathetic centers which largely control intestinal paristalsis. There was no instance of pseudoparesis of the bowels after any of the 53 kidney operations of this series. It is believed that the interdiction of a purge immediately preceding the operation is largely responsible. Reasonable catharsis, two to three days before, with an enema on the preceding night and morning, is much more logical. With this precaution the post-operative use of eserin or similar drugs to stimulate intestinal paristalsis are superfluous.

It has also become a surgical custom, largely on the plea of anesthetists, to add to the mental torment of the patient about to be operated that of physical thirst by refusing him all fluids from midnight on. This cruel treatment is not only unnecessary, but, in the type of cases under discussion, adds greatly to surgical risk. Water is the most efficient and safest diuretic and was given in both prostate and kidney cases right up to the time the patient was taken to the operating room. In the event of the operation being scheduled late in the morning or early in the afternoon, a cup of weak coffee or a glass of milk and a cracker may safely be allowed in the early morning upon awakening. This treatment not only gives them physical satisfaction, but insures a continued fluid stimulus to the kidneys during a period when it is most needed. There has been no instance of vomiting during the operation and no increase afterwards. There has also been no instance of post-operative anuria.

Operative management: The judicious placement of thorough drainage at the operation will most effectively combat post-operative infection. This is vital to success in kidney surgery. Rubber tube drainage is the most efficient. In nephrotomy, pyelotomy or plastic pelvic surgery in the presence of infection, the placing of small rubber tubes through the kidney substance into the pelvis, which may thus be irrigated at intervals, has given gratifying results. In several instances of infected nephrolithisis a small rubber urethral catheter was passed through the nephrotomy opening down the ureter for several cms. with perforations at different levels in the pelvis. Through this catheter ureteral and pelvic irrigations were given with complete cure of the infection. In another case of infected hydronephrosis and stone a pelvic plication was completely successful because of the ability to combat the infection through a catheter similarly placed. In some of the cases of bilateral infections where little secreting kidney tissue is left, and what there is must be most carefully preserved, such measures are indispensable.

Post-operative management: Infection still remains the great problem of post-operative management. It is a mistake after operation to leave the patient to combat his urinary infection unassisted. Urethrovesical irrigations and instillations with, in

some cases, periodic catheterization for purposes of more thorough vesical lavage, and, in cases with kidney infections, ureteral catheterization and pelvic instillations, are indicated. The facts definitely declare in favor of such persistent urologic after care. The two late deaths following prostatectomy, with their pictures of cystitis, ureteritis and pylonephritis, the known tendency of infection to lead to stone reformation after nephrolithotomy, demonstrate that the responsibility of the urologist does not cease upon discharge of his patient from the hospital.

Summary: The preliminary, operative and post-operative periods of treatment of prostate and kidney cases have an interdependent and equal value. Neglect of the details of any one may destroy the success expected in a perfect execution of the others.

Urinary infection is the most prevalent complication for treatment in each period of management. The majority of late fatalities are secondary to a refractory or untreated urinary infection.

The methods of management comprise general and special procedures. The former belong more particularly to the realm of internal medicine and will vary according to the clinical complication present. The special methods have been developed largely by urologists and comprise urinary antiseptics, urethral catheterization and urethrovesical therapy, cystotomy drainage, operative drainage and ureteral catheterization with renal therapy.

No satisfactory internal urinary antiseptic is known. Hexamethylenamine is the most efficient. In conditions of prostatism, however, bladder drainage and forced fluids largely nullify its value, and a true nephropathy, which so frequently co-exists, contraindicates its use. It has considerable prophylactic value in renal surgery.

The use of the urethral catheter is dangerous except under continuous supervision and in expert hands. Without experienced management the many grave complications that are likely to follow offset its anticipated advantages. Prostatic cases should not be subjected to preliminary catheter treatment indiscriminately nor as a fixed routine. There will be a small number of cases which will do better with no catheter treatment of any kind. Retention or periodic catheterization should be selected according to the individual indications and they can frequently be used alternately to advantage. Frequent urethral and bladder irrigations with non-irritating antiseptics are essential in the care of the catheter. Boric acid alone is unsafe, and while best adapted for general use should be supplemented by argyrol, potassium permanganate, bichloride of mercury, formalin, etc.

Cystotomy drainage will be demanded in relatively few cases, usually those complicated by vesicle stone, tumor or diverticulum. With inexperienced help cystotomy drainage is safer than urethral catheter drainage.

Severe purgation and the limitation of fluids just preceding operation are obsolete surgical habits, particularly apt to be pernicious in prostatic and renal surgery. Better results will follow the giving of the cathartic several days before operation and of fluids up to the moment the patient goes to the operating room.

The intelligent placement of rubber tube drainage at the time of operation will often prevent many grave post-operative complications and enable other complications to be safely treated.

Ureteral catheterization with dilatation of the ureters and pelvic lavage should be made use of frequently in the preparatory and post-operative treatment of renal infections complicating prostatic and kidney surgery.

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ACUTE GASTRO-DUODENAL PERFORATIONS.*

TREATMENTS, DIAGNOSIS, REPORTS OF SIX CASES, FOUR RECOVERIES.

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About fifteen per cent. of gastric ulcers and about twenty-five per cent. of duodenal ulcers rupture, according to Allaben, in the Illinois Medical Journal, 1909. Musser maintains that 28.1% of all ulcers perforate. Ulcers are more frequent in the male, and perforations occur in much greater proportion than in the female. Acute ruptured ulcers are most often located on the anterior wall of the stomach and first portion of the duodenum. The histories of cases of acute rupture are all somewhat similar. Previous gastro-intestinal disturbance may or may not be a part of the history. It is difficult and often impossible to get a satisfactory history from patients suffering from a ruptured ulcer.

The history in the chronic perforations may be misleading, but it is not in these cases that an error in diagnosis is so disastrous; so in this paper, only acute perforations will be considered.

Given a history of acute, severe, knife-like pains in the pit of the stomach, with or without previous indigestion, coming on when the stomach is empty or full, taking place while the patient is at rest or at work, acute perforation must be considered. Vomiting occurs usually shortly after the rupture, regardless of the location of the ulcer. Blood is very seldom noted in the vomitus. Vomiting is more continuous following duodenal perforations. Constipation is the rule, but a bowel movement hours after the perforation is possible with a mild peritonitis. The sudden, severe pain is not influenced by large doses of morphia. Later, when the patient becomes toxic from absorption, morphia is very effective for the relief of the agonizing, gnawing pain of that stage. The location of the pain is in the pit of the stomach.

Examination of the patient during the early hours of the condition. The patient as a rule assumes the dorsal position, crying for relief from the pain. The thighs are flexed upon the abdomen. Beads of perspiration stand on the brow. The face is not anxious, but gives evidence of great distress. The breathing is thoracic in type, and slightly more rapid than normal. The abdomen is retracted, rigid and board-like. The rigidity is most marked in the epigastrium. The tenderness is most marked in the region of the rupture

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